

SC Ocean Planning Initiative – Work Shop
April 24, 2008, Integrated and Prioritized Ocean Mapping Efforts (Notes)

(Morning Session - Presentations)

Welcome and Introductions (Braxton Davis): Braxton welcomed everyone and thanked NOAA Coastal Services Center for hosting, helping to plan the workshop, and working to assemble information and mapping data prior to the meeting. Braxton discussed the SC CZMP and DHEC-OCRM's role in planning for ocean resources. OCRM has direct permitting authority for development or alterations of marine and intertidal areas in SC out to 3 miles offshore; and indirect authorities over federal activities that occur beyond 3 miles but may impact the coastal zone. OCRM also has strategic planning responsibilities for the future of coastal and ocean areas, ensuring a balance between competing uses - development of economic resources and conservation of natural resources.

Braxton explained that SC is one of 35 state programs within the national coastal zone management program under the federal CZMA. The national program is a partnership between the states and NOAA, and about half of SC program's annual funding is awarded by NOAA for program administration, regulatory and planning activities, and policy development. One of the areas OCRM is encouraged to address through the CZMA is ocean governance. Several coastal states have launched state-level ocean planning initiatives through funding from the CZMA, and OCRM recently developed a 5-year strategy to do the same. The funding that OCRM receives will allow OCRM staff to support an equal partnership among state and federal agencies and researchers in the development of an ocean management plan for the state.

A ten-person Ocean Planning Work Group with representatives from federal, state, and academic institutions was recently convened to meet with experts and stakeholders on various issues over the course of the next several years, and to develop a final plan to guide future ocean research, data collection and mapping; policies and decisions of agencies with ocean authorities; and ocean education programs.

The first priority identified by the Work Group was the need to track down existing ocean resource maps to work from; and from this, to identify mapping priorities for the future in SC. This call for ocean mapping became the two goals of the SC Ocean Mapping Workshop.

Braxton walked through the day's agenda briefly explaining that the morning session would be a series of talks on ocean mapping, and the afternoon breakout session would allow for more detailed discussion about existing spatial data, gaps, and priorities across several ocean "issues."

SEAMAP Bottom Mapping Project and MMS INTERMAR
SC Task Force on Offshore Resource

(Dr. Robert Van Dolah, SCDNR Marine Resources Research Institute)

The presentation included an overview of the SEAMAP Bottom Mapping and MMS INTERMAR projects. The following information was presented for each project: project time frames, goals, data types, database structure, project results, benefits and deficits.

The Bottom Mapping Project was initiated in 1985, with the coastal shelf effort having been completed by 2000. The project resulted in a database housing over 65,700 records for the South Atlantic region (NC, SC, GA & FL) and, over 11,500 records off SC. The benefits of this program included having the most comprehensive bottom-mapping database (for any region) in the country and it was developed at a relatively low cost (for data mining only). It also included a GIS format for easy use. Deficits noted were that the data was static; the effort was not continuing; and there are some concerns w/ how data is presented on the web.

The MMS INTERMAR project was initiated in 1992 with the coastal shelf effort having been completed in 2001. The goals of the project included: 1) expanding the SEAMAP database to include sand, and mineral information; 2) collecting additional data in the nearshore coastal zone related to hard bottom and potential sand sources; and 3) conducting several special SC studies including:

- Shoreline migration rates and sediment budgets (Seabrook, Kiawah, Folly Island);
- Evaluation of beach renourishment;
- Evaluation of physical recovery rates in sand borrow sites; and
- Complete spatial analysis of bottom habitats

The project resulted with over 14,500 records for South Carolina – (approx. 3000 more records than SEAMAP). Graphics were presented illustrating data density per square mile with various sized grid cells. The benefits of this program included getting the best available data on sand resources at relatively low cost and having it available in GIS format. However, it was noted that like the SEAMAP effort, this data was static and the effort was not continuing. In addition, the USGS mapping effort was limited below the Grand Strand area.

Questions/Discussions

Q – What were the challenges, i.e. how was the data found, data mining or just knew where to find?

A – Primarily through networking with colleagues.

Q – What happened to INTERMAR?

A – The MMS program ended, no more funding.

South Carolina Coastal Erosion Study

(Dr. Paul Gayes, Coastal Carolina University)

The presentation gave an overview of the SC Coastal Erosion Study, which was supported by a partnership between USGS and SC Sea Grant, along with various supporting institutions and cooperative agencies. The objective of the study was to understand sediment transport and its effect on coastal change. The overall geologic framework included both onshore and offshore studies using a regional integrated phased approach. Existing shoreline change data was evaluated, which included: BERM-Long Profiling, Historical Shoreline Change, Beach Cams, and “SWASH” Surveys. ArcIMS was used for database integration and to provide access to that data.

Examples or graphics of the BERM-Beach Morphology and Erosion Monitoring methods and data were presented. Maps were produced based on data collected using side-scan sonar, swath bathymetry and seismic reflection. One of the focus areas using the regional framework was the Grand Strand region. Other assessments made included sand resources, shoal and sediment characteristics (thickness of Holocene sediment), transport routes (to the southwest), and seafloor characteristics such as rocky outcroppings and ledges. The overlapping of some bathymetry data provided habitat mapping opportunities and the findings from those were that confidence is low in the habitat value. Other sand resource study examples included: Folly Beach, Hilton Head, and Georgetown.

SC Eco-regional Assessment / Marine Mapping Strategies

(Mary Conley, The Nature Conservancy)

The presentation included an overview of The Nature Conservancy and its role in marine conservation; the Ecoregional Assessment for the Carolinas; the Northwest Atlantic Marine Ecoregional Assessment; and utilization of ecoregional assessments for ecosystem-based management.

The Nature Conservancy's conservation design, priority ocean geographies and the regional marine program areas were introduced. The marine ecoregional assessments include:

- Integrated data on habitats, species and marine resource use which provided a baseline for ecosystem-based management approaches;
- Integrated data sites representing a diversity of habitats, natural communities, and species;
- Informing strategies to protect sensitive living resources for multiple uses; and
- Next generation Ecoregional Assessments: a better characterization of connectivity, food web dynamics, and GIS data showing resiliency to specific threats

The ecoregional planning process contains eight general steps: 1) identify objectives; 2) select targets; 3) set goals; 4) identify threats, 5) develop spatial databases; 6) establish analysis units; 7) select sites; and 8) generate products. The Carolinian Assessment included VA, NC, SC, GA, & FL and contains mapped data for 36 conservation targets (e.g. Right Whale calving grounds, offshore reef and hard bottom habitat, HAPCs, etc.). The assessment also included mapped data for ten "cost factors" to develop a suitability index (e.g. population growth, shipping lanes, dredged channels, dredge disposal sites, etc.). MARXAN was used to identify conservation areas (41 areas = 21% of ecoregion = 3.77 million hectares). Ten sites were identified as initial priorities. Gaps and Limitations noted from the Carolinian Assessment include:

- Relied on regional data;
- Connections between nearshore and offshore were not incorporated;
- Benthic structural complexity needs to be validated;
- Offshore fish assemblages dependent on hard bottom, structural complexity (modeled) and HAPC data; and

- Costs primarily related to nearshore areas

The general findings about what the Carolinian and Northwest Atlantic Marine ecoregional assessments provide include:

- Decision support for locating energy infrastructure, aquaculture, dredging & spoil disposal, etc.
- Baseline information to support regional ocean governance initiatives
- Blueprint for biodiversity to support ecosystem based management approaches
- Enable marine spatial planning for multiple objectives
- Assessments will be updated on a 5-10 year basis

Questions/Discussion

Q – Habitat maps as proxy for biodiversity?

A – Focusing on existing priority areas. The link between habitat and actual biodiversity is challenging.

Seafloor Mapping / Transects Program

(Dr. Scott Harris and Dr. Leslie Sautter, College of Charleston)

The presentation provided an overview of the Transects Program at the College of Charleston and some of the seafloor mapping efforts in South Carolina. Methods used for seafloor mapping were described along with rationales, i.e. to identify resources, characterize habitat and study geologic history. For the past 2 years, groups of students have participated in vessel-based seafloor surveys offshore of South Carolina. The presentation gave examples of each survey method and how it is used, and types of results produced by the various methods. Method types include multi-beam and side-scan sonar (Coastal Carolina University), CTD casts, submersibles, scuba, etc. Students also get real experience processing the data and analyzing the results. Survey results were presented for areas including: the “Charleston Bump”, “Georgetown Hole”, the shelf edge, and SCAMP Ridge, among others. The geology of the outer shelf was described, including examples of habitat delineation and continental shelf classifications. Habitat characterizations and a meandering transect were also extrapolated from the data collected.

Environmental Effects & Information Needs of Alternative Energy Uses on the Outer Continental Shelf (Jacqueline Michel, Research Planning, Inc.)

The presentation discussed findings from a study initiated by the Minerals Management Service evaluating offshore alternative energy projects, predominantly offshore wind and reporting on environmental impacts and information needs. The study focused on European installations where offshore alternative energy has been ongoing for the past 20-30 years. To date, there are none in operation in the United States. Objectives of the study were to assess:

- Current offshore energy technologies and future trends
- Public acceptance

- Potential direct, indirect, cumulative environmental effects
- Mitigation measures
- Models to determine impacts
- Information needs to address data gaps

Types of impacts (habitat change, lost use, noise, contaminants, etc.) and recipients of those impacts (birds, fish, marine mammals, benthos, aesthetics, etc.) were described along with the various physical characteristics associated with the activities of the alternative energy installations. Information needs were identified in multiple categories including (for detailed list, see presentation):

- SC ocean mapping (navigation, distribution and abundance of natural resources, commercial v. recreational fisheries, cultural resources, cables, dredge borrow/disposal sites)
 - Point made here - potential use conflicts need to be identified.
- Physical resources
- Benthic resources
- Fishery resources
- Marine mammals
- Sea turtles
- Birds
- Socio-economics

Questions/Discussion

Point/question was raised re: how to interpret environmental change, and is it good or bad?

Q – Are there any offshore projects being considered in the Atlantic?

A – MMS is looking at the mid-Atlantic, off Savannah and off the NC/SC border.

Comment – In Europe, alternative energy is subsidized. Governments have taken a lead in identifying preferred sites for location of wind farms. In the U.S. MMS is leaving it up to the lessee to propose location and then be evaluated. Also in Europe, there are many comprehensive baseline studies and it is required that monitoring continue for the life of the wind farm. Once operations of a facility end, removal is required as well.

Q – What is the lead federal permitting agency in the U.S. for offshore alternative energy?

A – Minerals Management Service handles permits/leases for wind and Federal Energy Regulatory Commission (FERC) handles wave/current.

Comment – Entanglement is a big issue in the southeast area where there is a 25% mortality rate for bottlenose dolphin.

Q – What is the preferred distance offshore for wind farm location?

A – Generally 5.5 – 16 km. UK prefers 12km

Q – Are there any existing examples of multiple uses at these facilities? E.g. wind farms and aquaculture.

A – Not yet

Q – What do the Environmental Sensitive Index (ESI) maps cover?

A – The maps cover all of the coastal states, and each map generally contains three kinds of information: 1) Shorelines ranked based on their physical and biological character, then color-coded to indicate their sensitivity to oiling; 2) Sensitive biological resources, such as seabird colonies and marine mammal hauling grounds, are depicted by shaded polygons and symbol icons to convey their location and extent on the maps; and 3) sensitive human-use resources, such as water intakes, marinas, and swimming beaches (www.response.restoration.noaa.gov/esi).

Note: See the following MMS reports:

Michel, J., Dunagan, H., Boring, C., Healy, E., Evans, W., Dean, J.M., McGillis, A. and Hain, J. 2007. Worldwide Synthesis and Analysis of Existing Information Regarding Environmental Effects of

Alternative Energy Uses on the Outer Continental Shelf. U.S. Department of the Interior, Minerals Management Service, Herndon, VA, MMS OCS Report 2007-038. 254 pp.

Michel, J. and Burkhard, E. 2007. Workshop to Identify Alternative Energy Environmental Information Needs: Workshop Summary. U.S. Department of the Interior, Minerals Management Service, Herndon, VA, MMS OCS Report 2007-057. 55 pp. + appendices.

Overview of NOAA Integrated Ocean and Coastal Mapping (IOCM) and Activities of the Interagency Working Group on Ocean Mapping (IWG-OCM)
(Roger Parsons, NOAA)

The presentation discussed NOAA's IOCM effort and introduced IWG-OCM, one of the six Interagency Working Groups (IWG) under the Joint Subcommittee on Ocean Science and Technology (JSOST). It is chaired by USACE, USGS, MMS and NOAA. The IWG-OCM is currently working on an inventory of ocean mapping activities within the Federal government. IWG is working to carry out the recommendations of both the National Research Council Assessment (NRCA) of 2004 and the Federal Ocean Action Plan (2005). See the presentation for a list of the recommendations.

It was pointed out that there are numerous federal agencies, with the authority to be involved in federal ocean and coastal mapping. Currently, there is pending IOCM legislation that would codify the NRC and Ocean Action Plan recommendations; establish an interagency committee on ocean and coastal mapping; and establish a NOAA integrated mapping initiative.

As explained, the IWG-OCM Work Group facilitates collaborative Federal OCM activities, is facilitating the development of a National the ocean and coastal mapping inventory and the is developing a National OCM Strategic Action Plan with attention being directed towards the following in the next five years: development of tools that will support informed decision making; building support for implementation of IOCM; and development of a successful scalable IOCM model for success. Examples of IOCM opportunities were discussed which and included

the California Seafloor Mapping Project and the North Carolina Integrated Coastal Mapping Project. It was pointed out that the private sector definitely has a role in all of this, e.g. data acquisition and product development. The private sector interest should be included in the planning and development of IOCM activities maps.

Noted: In Oregon, a "Scientific Consensus Statement for mapping the Oregon Territorial Seafloor" was developed. Also, the West Coast Governors' Agreement on Ocean Health Action Plan will be available soon and will include recommendations for seafloor mapping.

(Afternoon Session – CSC and Breakout Group Discussions)

Drafting Thematic Maps for SC Ocean Planning

(Adam Bode and Charles Molnar, NOAA Coastal Services Center)

CSC discussed their experiences, lessons learned with the development of the thematic maps. The four themes or topic area maps included: Energy, Political Boundaries / Infrastructure, Sand Resources, and Marine Conservation. Challenges identified:

- Only one mapping layer for Energy
- No central location for ocean issue maps for SC
- Lack of high resolution data
- Differences in scale

The Workshop participants were divided into four groups. Each group met at a workstation with maps of a particular topic area for 15 minutes and discussed the maps – data provided, data gaps. The groups then came up with a list of ocean mapping priorities.

Recommendations:

- Static maps are not the answer. Need interactive maps that can be manipulated to address a specific question, issue or use; and do not separate maps based on topic or theme. Too many overlapping issues or conflict of uses.
- Educate state legislators on importance of mapping SC ocean waters.
- Need to have DOE involved re: energy resiliency for hardened structures (e.g. nuclear plants) b/c of potential conflicts.

Initial, DRAFT Mapping Priorities Identified:

- High resolution benthic habitat data
 - Seagrass, macroalgae
 - Phytoplankton in water column
- Water quality and chemistry
 - Aquifer discharge
 - Contaminant data
 - Beach closings, stormwater outfall pipe discharges
- Human Uses - Fishing activities
- CBRA zones and critical habitats

- Geography regulations – e.g. right whale migration routes v. navigation, shipping lane speed zones
- Marine Managed Areas
- Cultural resources – wrecks and obstructions (not just in terms of navigation hazards)
- Telecommunication cables, connector point to grid
- Bathymetry/substrate - sub-bottom data
- Integrate wind studies - Ground truthing data – wind (stratified), currents
- Tidal currents
- Hazards – risk v. reward
- Permitting jurisdiction, where located, other states
- High resolution sediment characterization maps – Priority Areas:
 - Near shore out to 5mi
 - Dredge disposal areas
 - MPAs
 - Inlets
- Sites for beneficial re-use of dredged material
- Resurvey Folly Beach and Long Bay to determine changes and intervals at which to survey/monitor
- Minerals
- Borrow sites and recovery rate (good, poor)
- Bathymetry nearshore
- Population centers and sand demands along coast (based on erosion rates, color code shoreline)
- Cost analysis (Folly Beach and Long Bay Studies)
- Local sand requirements (grain size, etc.)
- Tidal resources in inland waterways
- Socio-economic data
- Governance - energy

Common, Priority Needs:

1. High resolution bathymetric data (multi-beam)
2. Habitat classification system
3. Inventory of sand resources

Notes/Next Steps:

Presentations are available upon request – and will be posted to our new ocean planning web page (coming soon). Contact Melissa Rada at radams@dhec.sc.gov.